Developing Numeric Nutrient Criteria for Mississippi

Stakeholder Update

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Jackson, MS
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Criteria are required by law

- Water quality standards (WQS) are required by the Clean Water Act for waterbodies in MS
  - A water quality standard = A designated use + **criteria** to protect the use + policy to prevent degradation
  - MDEQ has many criteria to protect designated uses from different pollutants

Water Quality Criteria

- A concentration, level, or narrative statement
- Represent a level of water quality that supports a particular designated use
- States must adopt criteria that protect the designated use(s)
  - Based on a sound, scientific rationale
  - Sufficient parameters to protect the designated use
  - Must support the most sensitive use

Nutrient Criteria

- Nutrients are a major pollutant contributing to impairment of waters nationwide
- EPA developed an Action Plan for nutrients in 2001 that included states developing numeric nutrient criteria to protect uses from nutrient pollution
- Early on…MDEQ developed a task force and a plan for developing nutrient criteria
- MDEQ's Mission:

  Develop appropriate and protective numeric nutrient criteria for Mississippi's waters that are scientifically defensible.

MS Nutrient Task Force

- Initiated criteria planning in 2000
- Decided that criteria should be developed based on water body type
  - Lakes and Reservoirs
  - Streams and Rivers
  - Estuaries and Coastal Waters
- Established different committees to focus on different water body types
- Developed the first Nutrient Criteria Development Plan for Mississippi

Implementing Our Plan

- Took action on the Task Force's recommendations
- Data and information gaps were identified by the Task Force
- Efforts were initiated to address these gaps
  - Data collection across various water body types
  - Establishing biological indicators
  - Preliminary nutrient criteria analyses

Data Collection Efforts

- Data collection efforts were developed to fill data and information gaps
- MDEQ-led data collection:
  - Data collection efforts in all water body types across the state
  - EPA GMPO grant for intensive nutrient study of St. Louis Bay watershed
  - Continued sampling of benthic macroinvertebrate communities within wadeable streams throughout the state (M-BISQ)
  - Sampling of benthic communities and DO data within Delta waters
  - 319/BMA Projects

Tool Development

- MDEQ has developed and continues to develop and evaluate multiple tools in an attempt to make the connection between nutrient concentrations and biological response
  - M-BISQ Recalibration
  - Benthic Index for Coastal Waters
  - Benthic Index for Delta Waters
  - Fish data for Delta waters

Timeline

- Mutually-agreed upon plan (Oct 2010) with EPA lists June 30, 2013 as our date for non-Delta waters to go to Public Comment
  - Date has been postponed
  - Evaluating the latest science and NNC guidance and efforts
  - Implementation planning
  - Addressing stakeholder questions/concerns
- Non-Delta Waters do not have a revised date for draft at this time
  - Lakes and Reservoirs
  - Wadeable Streams; Non-wadeable Streams
  - Coastal and Estuarine Waters
- Public Comment Period for Delta Waters begins no earlier than November 30, 2014
- Adoption by Commission
- Approval by EPA

MS Nutrient Technical Advisory Group

- MDEQ is committed to a defensible, science driven process for deriving protective criteria
- At the core of this process is the input, review, and guidance of technical work by a committee of research, state and federal agency scientists with technical expertise relevant to nutrient science
- MDEQ formed the Nutrient TAG to be this committee
- TAG's Mission:

  Provide technical expertise and regional knowledge to MDEQ for the development of scientifically defensible numeric nutrient criteria.

MS Nutrient Technical Advisory Group

GULF COAST
RESEARCH LABORATORY
THE UNIVERSITY OF SOUTHERN MISSISSIPPI

United States Department Of Agriculture
Agricultural Research Service

Nutrient Criteria Analysis

- Goal: scientifically defensible, protective criteria developed using a transparent, well-documented process

- Methods based on USEPA Nutrient Criteria Guidance
  - Data Compilation
  - Classification of Waters
  - Data Analysis using Multiple Lines of Evidence
  - Criteria Derivation

Data Analysis: Multiple Lines of Evidence

- Using multiple lines of analysis to define a specific endpoint
- Alternative to single analysis approaches
- Especially useful with complex systems

"A weight of evidence approach that combines any or all of the three approaches above will produce criteria of greater scientific validity"

-USEPA 2000, SAB 2010

Lines of Evidence

- Distributions of nutrient values in minimally disturbed sites and sites attaining designated uses
- Stressor-response empirical models of nutrients versus biological/chemical responses
- Mechanistic water quality model output
- Scientific literature on nutrient effects

Status of Technical Efforts

Streams

Option 1- Single values

Magnitude:
TP: 0.060 - 0.150 mg/l
TN: 0.75 - 1.20 mg/l

Duration: Geometric annual mean
- Based on underlying data

Frequency: Not to be exceeded more than 2 out of 5 years
- Based on variability analysis

Streams

Option 2 – Range with site specific adjustment

Magnitude:
TP: 0.040 - 0.2 mg/l
TN: 0.45 - 1.40 mg/l

Duration: Geometric annual mean

Frequency: Not to be exceeded more than 2 out of 5 years

Implementation: A site with no demonstrable nutrient effect (MBISQ, DO, or Section II.2 of MS WQS) and nutrients within or below range, does not violate criterion.

Site specific nutrient numeric would be adjusted to the long-term 75th percentile seasonal geometric mean.

*This was approach used for FL lakes

Streams

Option 3 – Range with bio-confirmation

Magnitude:
TP: 0.040 - 0.2 mg/l
TN: 0.45 - 1.40 mg/l

Duration: Geometric annual mean

Frequency: Not to be exceeded more than 2 out of 5 years

Implementation: A site is only impaired if it violates the upper range value and the MBISQ, DO, or Section II.2 of MS WQS. No impairment based on nutrients alone.

Could combine with option 2 for site specific adjustment.

*This was approach used for FL streams

Lakes/Reservoirs

Option 1- Single values

Magnitude:
TP: 0.090 mg/l
TN: 1.25 mg/l
Chlorophyll a: 20 ug/l

Duration: Seasonal (June-October) Geometric Means
- Consistent with assessment periods for DO
- Acute could be considered

Frequency: Not to be exceeded more than 2 out of 5 years
- Based on stream criteria nutrient variability analysis

Lakes/Reservoirs

Option 2 – Range with site specific adjustment

Magnitude:
TP: 0.050 – 0.160 mg/l
TN: 0.680 – 1.70 mg/l
Chlorophyll a: 20 ug/l

Duration: Seasonal (June-October) Geometric Means
- Consistent with assessment periods for DO
- Acute could be considered

Frequency: Not to be exceeded more than 2 out of 5 years
- Based on stream criteria nutrient variability analysis

Implementation: As long as chl a criterion is met and nutrients are within range or below, nutrient criteria is not violated.

Site specific nutrient numeric would be adjusted to the long-term 75th percentile seasonal geometric mean.

Lakes/Reservoirs

Option 3 – Range with bio-confirmation

Magnitude:
TP: 0.050 – 0.160 mg/l
TN: 0.680 – 1.70 mg/l
Chlorophyll a: 20 ug/l

Duration: Seasonal (June-October) Geometric Means
- Consistent with assessment periods for DO
- Acute could be considered

Frequency: Not to be exceeded more than 2/5 years
- Based on stream criteria nutrient variability analysis

Implementation: A site would only be impaired which violates the chlorophyll a criterion or the upper range value and (the chlorophyll a criterion or DO minimum criterion or other nutrient related violation of Section II.2 of the MS water quality standards). No impairment would be made for violating the nutrient criterion alone. Could combine with option 2 as well, if desired, using the range.

Coastal/Estuarine/Tidal

Note: Still very preliminary

Magnitude:
Ranges from analyses to date (could still change)
Chl a: 6 – 15 ug/L
TN: 0.60 – 1.0 mg/L
TP: 0.05 – 0.20 mg/L

Duration: Seasonal (June-October) Geometric Means
- Consistent with assessment periods

Frequency: Not to be exceeded more than 2/5 years
- Based on other waterbody analyses

Implementation: Same options as for other waters
Single numeric
Range with site specific or bioconfirmation

Beyond the Number: Implementation Planning

- MDEQ Interdivisional Implementation Workgroup formed to work through issues identified by MDEQ staff, partners, and stakeholders
  - Permitting implications
    - Compliance Schedules
    - Variances/Mixing Zones/Others
  - Assessment implications
  - TMDLs/WLAs
  - Watershed Planning

Implementation Workgroup

- Workgroup compiling implementation questions related to nutrient criteria such as
  - How will the number be written into our standards?
  - How will we monitor/assess for nutrients?
  - How will we incorporate this number into permits?
  - How long will it be before facilities see nutrient limits in their permits?
  - How long will facilities have to comply with new permit limits?
- Survey will be sent out soon to stakeholders asking for feedback on the questions as well as stakeholder feedback on question prioritization
  - Be looking for this in your email soon! Please respond! We need your input!!!
- Subcommittees will initiate developing responses to these questions
  - MDEQ will work with external stakeholders to get feedback and input as well
- Responses will ultimately be part of an implementation document/plan

Moving Forward in MS

- MDEQ will continue work through the criteria development process with TAG support and Stakeholder input
- Increased focus on Internal/External Implementation Planning
- Stakeholder Outreach an MDEQ Priority
  - MDEQ will continue regular Stakeholder Update Sessions
  - Continue to provide the opportunity for stakeholders to stay informed and also express their comments and/or concerns regarding both the criteria development efforts and plans for implementation of those criteria
    - Technical concerns/suggestions may be relayed back to DEQ
    - Policy concerns can be relayed to MDEQ upper management

Moving Forward in MS

- Written comments on stream criteria have been received from stakeholders
  - Concerns about stressor-response analyses and defensibility
  - Agency reviewing concerns and communicating to TAG for their input
- We are not currently in the formal comment period – that will come later
  - The sooner we know about your concerns, questions, suggestions, etc. the better…MDEQ can start looking at those now

Update on Important Nutrient Criteria Issues

Bioconfirmation = Combined Criteria

- On September 12, 2013 USEPA published the "Guiding Principles on an Optional Approach for Developing and Implementing a Numeric Nutrient Criterion that Integrates Causal and Response Parameters"
- Only applicable to nitrogen and phosphorus
- Rules for Use
  - Must be protective – numeric values for all parameters must be set to protect uses
  - Sound Science Rationale
    - Criterion process should be thoroughly documented
    - Sensitive Indicators : TN, TP, Productivity measures (chlorophyll-a, percent algal/plant cover), algal assemblage structure, functional measures (pH and DO)
    - Reliance on higher trophic levels alone (invertebrate/fish), may not be adequate, need to be coupled with others
    - Must have sufficient data
    - The use one or more of these ideal response indicators is recommended

Expression of the Criterion

- Causal and response parameters must be combined into one criterion
- Parameters should be expressed numerically
- Duration and frequency components for all parameters should be included
- Must clearly establish the water quality goal that applies for permitting, assessment, and TMDL decisions
- If using a range, must include transparent decision framework to use in that range.

Expression of the Criterion

Criterion	Water Body Condition
All causal and response parameters are met	Meeting designated use
All response parameters are met, but one or more of causal parameters is exceeded	Meeting designated use
A causal parameter is exceeded and any applicable response parameter is exceeded	Not meeting designated use
A causal parameter is exceeded and data is unavailable for any applicable response parameters	Not meeting designated use
A causal parameter is not exceeded but an applicable response variable is exceeded	Not meeting designated use (further investigation may be needed to determined if nutrient pollution is the cause)

What Does this Mean for MS?

- The "Guiding Principles" document describes a more rigorous data requirement for bioconfirmation than what we currently have
  - Investigating sufficiency of current algal/plant measures/data
  - Do not have current chlorophyll a/percent cover measure
  - Could lengthen criteria development process if combined criteria are desired
- How does this change our current options?
  - The "Guiding Principles" only loosely addresses a range approach
  - Addresses bioconfirmation, but bioprotection could be a possibility
  - A purely numeric criteria is still an option

Nutrient Criteria Nationally

- Florida
- Mississippi River Petition
- New Hampshire (Dover v. EPA)
- Blackstone River (Blackstone WWTP vs EPA)
- Secondary Treatment Standards Petition
- NACWA Congressional Petition

Florida

- EPA Necessity Determination – 2009
- EPA Phase I – Inland Criteria – Jan/Nov 2010
- Lawsuits– 2011
- “Stoner Partnership Memo” – March 2011
- Court Decision – Feb. 2012
- FDEP Inland Criteria Proposed – June 2012
- EPA Remand Criteria Proposed – Nov 2012

Florida

- On Nov. 30 2012 EPA published:
  - Approval of FDEP rule (inland and some estuarine)
  - EPA Remand Rule for Inland waters (gap waters)
  - EPA Phase II Coastal/Estuarine Rule
  - Motion to stay the rule until Nov 2013 [was in effect in January 2013)
    - April 2013 – Judge Hinkle heard oral arguments on staying final rule
      - Did not grant stay on lakes and springs (Same as EPA's)
      - Stayed implementation of DPVs – wait for final rule
      - Streams - wait for final rule

Florida – Agreement in Principle

- March 15, 2013 – Agreement in Principle; EPA and FDEP
  - List of things that, if happen, will allow EPA to stop and withdraw their rule(s);
    1. Complete marine/estuarine criteria
    2. Adopt Implementation Document into Rule
  - If FDEP does these things and approves Implementation Document, EPA will amend determination to exclude gap waters, DPVs, and will cease final rulemaking on inland and coastal waters

Florida – Agreement in Principle

- FDEP Implementation Document -June 2013
  - EPA Approved June 2013
- FDEP submitted marine/coastal criteria – Aug 2013
  - EPA Approved last week – Sept 2013
- EPA Amended determination - June 2013
  - Remove DPV requirement
  - Allow a "gap" in waters considered
- EPA moves to revise consent decree – June 2013
  - To match amended determination

Florida

- FDEP has approved rules for inland and coastal waters
  - Not in force until EPA withdraws theirs and confirms FDEP rules fulfill consent decree.
  - EPA just approved final set of coastal criteria and plan to finish the rest
  - EPA has not yet withdrawn their rule, still needs to revise consent decree for waters definition and DPVs
- Poison Pill still in play - Approve, remove, and satisfy determination or else “not implement” these rules

Florida

- September 2013 - Judge heard oral arguments on an amended determination
  - Briefs flying back and forth;
  - Plaintiffs arguing EPA approved rule does not meet consent decree;
  - Judge due to rule "soon after EPA approves FDEP criteria"
- March 2013 – FWF Notice of Intent to Sue EPA on FDEP anti-degradation provision
  - FDEP has not evaluated assimilative capacity of its Tier 2 (really good) waters
  - EPA should disapprove 303d lists for last 6 years.
  - A new wrinkle

Mississippi River

- July, 2008 -13 NGOs file petition for criteria/TMDLs
- Given known problems and lack of progress; EPA should:
  - Impose WQS for Northern Gulf, and all waterbodies in all states without nutrient WQS; or
  - Impose WQS for Northern Gulf, and all waters in MARB; or
  - Mainstem Mississippi River and Northern Gulf of Mexico; or

  and
  - Establish TMDL for N and P in Gulf, Mississippi River, and each tributary that fails to meet numeric N and P criteria; or
  - Establish TMDL for N and P in Gulf and mainstem Mississippi River.

Mississippi River

- April 11, 2011 - Petition filed for a response, threatening litigation
- July 29, 2011 - EPA responded
  - No argument with extent of nutrient problem;
  - EPA stated it is denying petition and that:
    - Addressing any of those scenarios too resource intensive and impractical/inefficient;
    - It will continue on current path of working with states, its long standing policy;
- March 13, 2012 – Petition court under APA
  - EPA failed to respond to petition properly – need to provide explanation for why WQS are not necessary not why EPA can't do it.
  - States and Agricultural Groups intervene to be parties to petition
- 2012/2013 - Briefs are flying back and forth

Mississippi River

- September 2013 – Judge's ruling:
  - EPA's motion to dismiss is denied
  - EPA must make necessity determination
    - Has 180 Days
  - Plaintiff summary judgment request is denied
    - Need not consider science only
    - Can resource limitation be used? If so, how?

Other Relevant Developments

- Secondary Treatment Standards
- Blackstone River – Supreme Court denied to hear
- Great Bay, NH – Lost on first decision, plaintiff's amending suit
- NACWA proposal for congressional action on water issues – still in play

- Mississippi River – Ohh boy….

NRDC Petition on Treatment Standards

- Secondary Treatment Standards
  - NRDC petitions EPA to define secondary treatment standards for nutrients – twice (2010 latest)
  - EPA response on December 14, 2012
    - Does not publish secondary treatment standards for nutrients – insufficient data
    - Uniform secondary treatment limits for nutrients "not warranted at this time"
    - "The EPA is effectively pursuing the control of nutrient discharges at POTWs by means of site-specific, water-quality-based permitting"

Blackstone River POTW

- Blackstone River Permit – Rhode Island / Massachusetts
  - POTW sued that off-the-shelf criteria EPA used were not scientifically defensible
    - Dec 2012 - Court decides in favor of EPA (against POTW and NGOs) in setting the limits it set;
  - Feb 2013 Blackstone asked supreme court to review;
    - NACWA filed amicus brief saying “off-the-shelf” criteria are indefensible, permit limits need to be based on site specific factors
    - Supreme Court denied to hear it.
  - WERF working on site specific nutrient criteria project.

Great Bay Estuary, NH

- Great Bay Estuary, NH
  - Set nutrient permit limits to protect seagrasses
    - POTW sues arguing that limits are not causally linked to seagrass improvement
      - Sued EPA for failure to comply with CWA by not reviewing the limits imposed as WQS changes;
      - Court dismisses complaint;
      - Plaintiff amending complaint
    - Petition to Environmental Appeals Board to review permit
      - Arguing that it is scientifically indefensible
      - No idea on Status

NACWA/WEF/WERF Proposal

- April 2013 – NACWA Call for Federal Action
  - 10 Priority Actions – Utility of the Future
  - Watershed Based CWA – equitable treatment of sources, flexibility in reduction strategies, etc.
  - Investment support for upgrades
  - Also, want a congressional caucus formed to consider: "revised permit compliance schedules, assistance for municipalities to establish compliance priorities, new management consideration of Total Maximum Daily Loads (TMDLs) and a presidential executive order creating a task force on water reuse issues."

Questions?
Comments?
Concerns?